

IN THE CLAIMS

Following is a complete set of claims as amended with this Response.

1           1.     (Currently Amended) A method for removing effects of  
2 gain and phase mismatch in amplification branches of a linear  
3 amplification using nonlinear components (LINC) system,  
4 comprising:  
5         ~~receiving an input signal;~~  
6         receiving calibration signals;  
7         calculating a relative phase and gain difference in the  
8 amplification branches, generating a look-up table for phasing  
9 component generation;  
10        receiving an input signal;  
11        generating phasing components; and  
12        controlling separation of the input signal into a plurality  
13 of branch signals of different but constant envelopes by  
14 appropriately applying the phasing components to the  
15 amplification branches, such that when the branch signals are  
16 recombined, the combined signal substantially replicates the  
17 input signal.

1           2.     (Currently Amended) The method of claim 1, wherein  
2     said calculating a relative phase and gain difference includes  
3           modulating and sending two calibration signals and  
4     demodulating the ~~training~~ signals using a receiver.

1           3.     (Currently Amended) The method of claim 2, wherein  
2     said modulating and sending two calibration signals and  
3     demodulating the signals includes:  
4           ~~calculating reference vectors of the branch signals, where~~  
5     ~~each reference vector accounts for total gain and phase shift of~~  
6     ~~a corresponding branch signal when no phase shift is applied to a~~  
7     ~~phase modulator in the corresponding branch~~

8           generating two sets of branch signals, the first set of  
9     branch signals  $S_1(t)=A$  and  $S_2(t)=Be^{jX}$  forming the first  
10    transmission signal and the second set of branch signals  $S_1(t)=A$   
11    and  $S_2(t)=-Be^{jX}$  forming the second transmission signal, where  $A$   
12    and  $B$  are the reference vectors and  $X$  can be any constant  
13    selected in the modulation process; and,

14           using a receiver to demodulate the first received signal  
15     $R_1=G(A+Be^{jX})$  and the second received signal  $R_2=G(A-Be^{jX})$  and  
16    determine  $A$  and  $B$  up to a constant complex scale by processing  
17    the two received signals with  $(R_1+R_2)/2$  and  $(R_1-R_2)/(2e^{jX})$ , where

18 G is a complex number representing the gain or attenuation of the  
19 receiving path.

1 4. (Currently Amended) The method of claim 1, wherein  
2 said generating a look-up table for phasing component generation  
3 ~~phasing components~~ includes  
4 configuring ~~an~~ a generalized elliptic curve based on the  
5 calculated reference vectors A and B and establishing one-to-one  
6 mapping between the points on the curve and possible values of  
7 the input signal's magnitude.

1 5. (Currently Amended) The method of claim 4 1 wherein  
2 said generating phasing components includes  
3 obtaining a point on the generalized elliptic curve  
4 corresponding to a vector having same magnitude as the input  
5 signal.

1 6. (Currently Amended) The method of claim 5, wherein  
2 said obtaining a point on the elliptic curve includes  
3 searching for an appropriate value for  $\phi$  ~~from~~ such that  
4  $|S(t)| = |(A + B) \cdot \cos\phi + j(B - A) \cdot \sin\phi|$ , where  $|\cdot|$  stands for the  
5 magnitude of the argument,  ~~$|S(t)|$~~   $S(t)$  is the magnitude of the  
6 input signal, and A and B are the reference vectors.

1           7.     (Currently Amended) The method of claim 5 4, wherein  
2     said ~~obtaining a point on the elliptic curve~~ generating a look-up  
3     table for phasing component generation includes  
4             ~~generating a lookup table having a corresponding~~  
5     ~~relationship between magnitude of the input signal and the point~~  
6     ~~on the elliptic curve~~  
7             tabulating the parameter  $\phi$  as a function of any possible  
8     values of the input signal's magnitude  $|S(t)|$ , such that  
9      $|S(t)| = |(A + B) \cdot \cos\phi + j(B - A) \cdot \sin\phi|$ .

1           8.     (Currently Amended) The method of claim 7 5, wherein  
2     said obtaining a point on the elliptic curve includes  
3             searching the lookup table for the  $\phi$  related to the point on  
4     the elliptic curve that corresponds to a vector having the  
5     desired same magnitude of the input signal.

1           9.     (Currently Amended) The method of claim 4, wherein  
2     said generating ~~phasing components~~ a lookup table for phasing  
3     component generation includes  
4             calculating a phase skew  ~~$\{A\}$~~ , which is a the phase  
5     difference between ~~a vector ending at a point on the elliptic~~  
6     ~~curve and a sum vector that is a sum of the reference vectors  $Z_3$~~   
7     and  $Z_1$ , where  $Z_3 = (A + B) \cdot \cos\phi + j(B - A) \cdot \sin\phi$  is a point on the

8 generalized elliptic curve corresponding to a parameter  $\phi$  and  
9  $Z_1 = (B + A)$ , and  
10 tabulating the phase skew  $\Delta$  as a function of any possible  
11 values of  $\phi$  or, equivalently, any possible values of the input  
12 signal's magnitude  $|S(t)|$ .

1 10. (Currently Amended) The method of claim 9 1 wherein  
2 said generating phasing components includes  
3 ~~generating a look-up table having a corresponding~~  
4 ~~relationship between a phase skew ( $\Delta$ ) and a point on the elliptic~~  
5 ~~curve~~ searching the look-up table for the corresponding  $\phi$  and  $\Delta$   
6 given an input signal's magnitude  $|S(t)|$ .

1 11. (Currently Amended) The method of claim 1, wherein  
2 said controlling separation of the input signal into a plurality  
3 of branch signals includes  
4 applying appropriate phasing components  $\theta(t) - \Delta - \phi$  and  $\theta(t) - \Delta + \phi$   
5 to phase modulators in amplification branches to generate at  
6 least following branch signals  $S_1(t) = A \cdot e^{j(\theta(t) - \Delta - \phi)}$  and  
7  $S_2(t) = B \cdot e^{j(\theta(t) - \Delta + \phi)}$ , where  $S_1(t)$  is a first branch signal and  $S_2(t)$   
8 is a second branch signal, A and B are reference vectors,  $\theta(t)$  is  
9 phase of the input signal  $S(t) = |S(t)|e^{j\theta(t)}$ ,  $\Delta$  is the corresponding  
10 phase skew,  $\Delta$  and  $\phi$  corresponds to the are associated with a

11 point on the generalized elliptic curve that relates a vector  
12 having the same magnitude as the input signal.

1 12. (Currently Amended) The method of claim 11, wherein  
2 said controlling separation of the input signal into a plurality  
3 of branch signals includes

4 approximating  $S(t) = |S(t)|e^{j\theta}$  by  $V_{min} \cdot e^{j\theta}$  with a corresponding  
5  $\phi$  achieving the minimum when

6  $|S(t)| < V_{min} = \min_{0 \leq \phi \leq \pi/2} \{|(A+B) \cdot \cos \phi + j(B-A) \cdot \sin \phi|\}$ , where  $V_{min}$  defines  
7 the radius of a dead circle within which an input signal may only  
8 be approximated with a two-branch LINC system with branch  
9 mismatches.

1 13. (Original) The method of claim 12, where said  
2 controlling separation of the input signal into a plurality of  
3 branch signals includes  
4 providing at least three branch signals to avoid the dead  
5 circle.

1 14. (Original) The method of claim 13, where said  
2 providing at least three branch signals includes  
3 providing a third branch signal with a vector whose  
4 magnitude is larger than the radius of the dead circle.

1           15. (Currently Amended) The method of claim 14, where said  
2 providing a third branch signal moves the dead circle away from a  
3 null position by forming a new input signal with magnitude larger  
4 than the radius of the dead circle.

1           Claims 16-24 (Canceled)